

How wells and sampling track groundwater contamination

Groundwater sampling and monitoring is an important part of both the Superfund investigation currently under way at BNL and the existing site environmental monitoring program.

More than 600 wells on- and off-site are sampled, many on a regular basis, providing detailed information on groundwater quality, flow directions and flow rates. These data allow BNL to both track contamination from known sources and investigate suspected sources.

The groundwater monitoring program at BNL is operated jointly by the Office of Environmental Restoration (OER) and the Safety & Environmental Protection (S&EP) division. OER is concerned with investigating and “characterizing” the distribution and movement of contaminants released to the environment as a result of past Laboratory operations, as well as long-term plume remediation system moni-

toring. S&EP routinely performs monitoring to satisfy environmental reporting requirements and N.Y. State permit requirements.

Types of wells

The two offices use three different kinds of wells to do their work. Permanent monitoring wells are PVC-cased wells that are used to take water samples on an on-going basis. Ranging from 10 to 300 feet in depth, permanent wells make up the majority of wells found on- and off-site, and are the type used almost exclusively in the routine monitoring program. Piezometers are permanent monitoring wells that are primarily used to report groundwater elevation measurements and determine speed and direction of groundwater flow.

Vertical profile wells are temporary wells that are used mainly in the early phase of an investigation to

locate areas of contamination. Ranging up to 300 feet in depth, these wells are typically drilled, sampled, and backfilled within a two-week period.

“GeoprobessTM” are a third way in which groundwater can be sampled. These highly-mobile truck-mounted probes are used mainly to investigate known or suspected source areas, and can take samples from depths up to approximately 100 feet below land surface. They are commonly used by OER to investigate suspected areas of contamination close to a potential source, and recently played a major role in the delineation of the tritium plume.

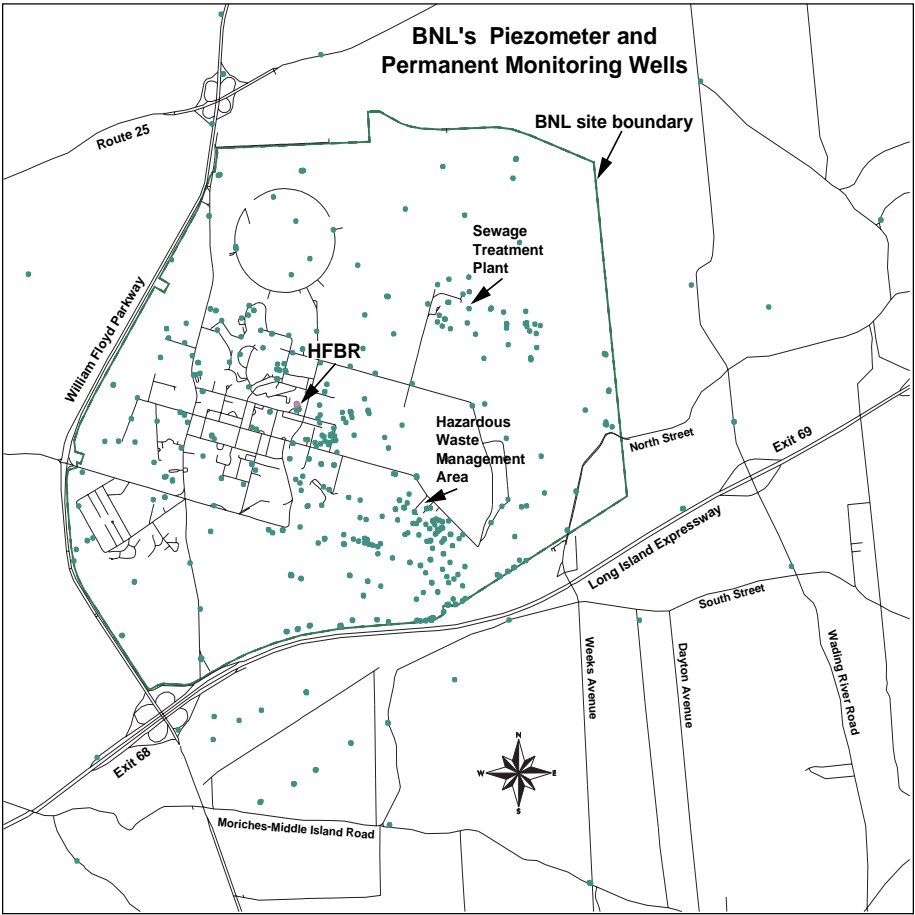
Sampling protocol

During 1996, approximately 200 permanent wells were sampled as part of the Routine Groundwater Surveillance Program, and approximately 200 permanent and 60 temporary wells were sampled as part of the Environmental Restoration program. The samples, taken from varying depths within the aquifer, are tested for a wide range of chemicals and radionuclides, including volatile organic compounds, tritium and other radionuclides such as strontium-90.

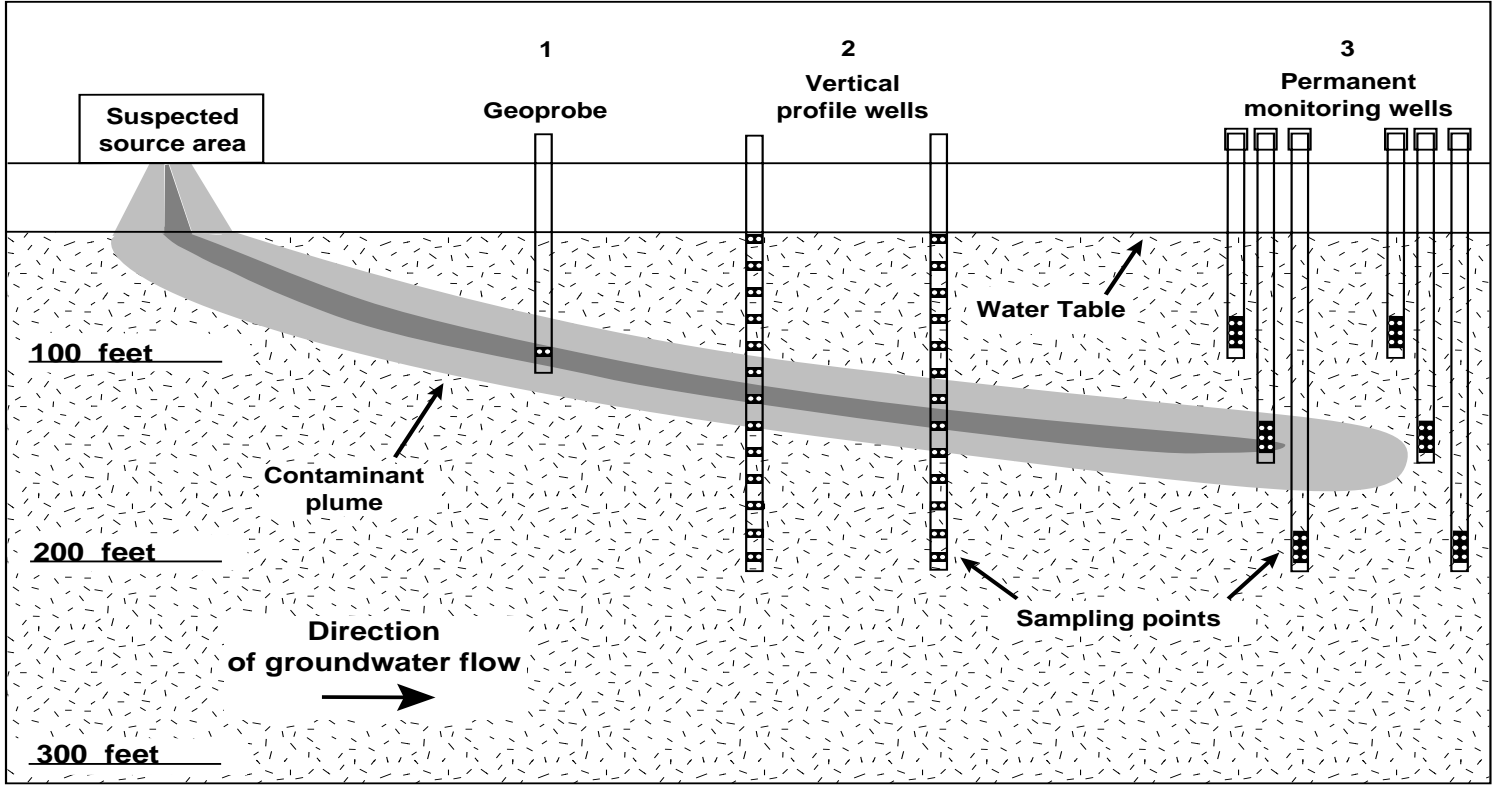
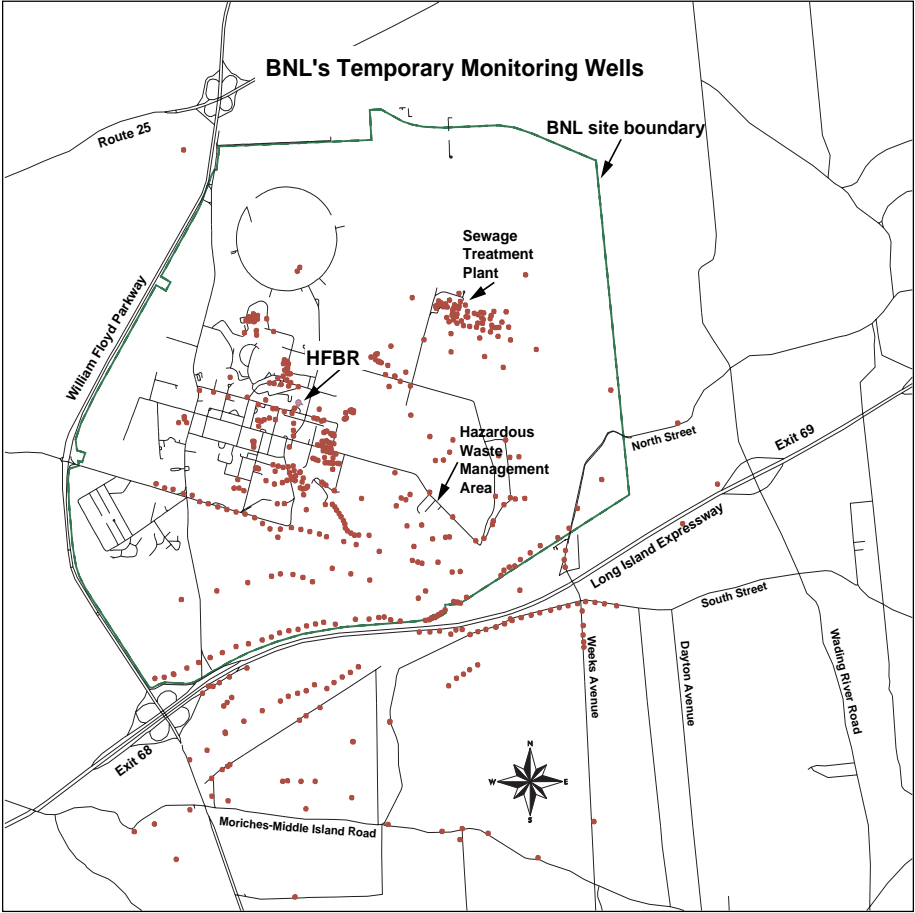
The selection of wells and sampling frequency is based upon knowledge of waste disposal practices, spill reports, existing groundwater data, regulatory requirements, contaminant mobility and site hydrogeology. Groundwater sampling schedules are documented both in the annual BNL Environmental Monitoring Plan and in Superfund-designated, Operable Unit-specific Remedial Investigation/Feasibility Study Work Plans prepared under the Interagency Agreement.

Program is growing

Over the past 20 years, the monitoring program has expanded significantly. In 1971, the Lab sampled approximately 60 wells as part of the program. By 1990, that number had climbed to more than 200, and today more than 640 wells are part of the program. Most of the wells are sampled twice a year, some are sampled quarterly and a few are sampled monthly.



More than 600 permanent monitoring wells and piezometers (above) dot BNL and the surrounding area. Temporary monitoring wells (below) help track contamination.



- 1) “Geoprobess” investigate suspected contamination sources, sampling as deep as 100 feet below ground.
- 2) Vertical profile wells sample every 10 feet to help delineate the vertical extent of contamination.
- 3) Permanent monitoring wells are installed to monitor groundwater quality over an extended period of time, and are generally installed in “clusters” for sampling at different depths.